What is Claimed is:

1. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said measuring pipe, and applies a first magnetic field having a first frequency to the fluid;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by amplitude-modulating a carrier having the first frequency by a modulated wave having a second frequency;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which separates a component of the first frequency from the electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference

frequencies of the first and second frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

2. A flowmeter according to claim 1, wherein

on the basis of the amplitude ratio Ram obtained by said signal conversion section, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, and an amplitude modulation index m_a of the second magnetic field, said flow rate output section calculates the flow rate of the fluid by $\alpha \times \omega 0\{-8\sin(\theta 2) + Ramm_a(16 - Ram^2 m_a^2)^{1/2}\}/\{8 + 8\cos(\theta 2) - Ram^2 m_a^2\}$ (α is a coefficient).

3. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said

measuring pipe, and applies a first magnetic field having a first frequency to the fluid;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by amplitude-modulating a carrier having the first frequency by a modulated wave having a second frequency;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which separates a component of the first frequency from the electromotive force detected by said electrode to obtain a first phase difference between the first exciting current supplied to said first exciting coil and the component of the first frequency separated from the electromotive force, and separates one of components of sum and difference frequencies of the first and second frequencies from the second exciting current supplied to said second exciting coil and separates one of the components of the sum and difference frequencies from the electromotive force to obtain a second phase difference for the same frequency between the component separated from the second exciting current and the component separated from the electromotive force; and

a flow rate output section which calculates a

flow rate of the fluid on the basis of the first phase difference and the second phase difference obtained by said signal conversion section.

4. A flowmeter according to claim 3, wherein

on the basis of the first phase difference ϕor and the second phase difference ϕam, which are obtained by said signal conversion section, the first frequency $\omega 0$, and a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, said flow rate output section calculates the flow rate of the fluid by $\alpha \times \omega 0 \tan(\pi/2 + \phi am - \phi or - \theta 2/2)$ (α is a coefficient).

5. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said measuring pipe, and applies, to the fluid, a first magnetic field obtained by amplitude-modulating a carrier having a first frequency by a modulated wave

having a second frequency;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by amplitude-modulating the carrier having the first frequency by a modulated wave having the same frequency as that of the modulated wave and an opposite phase;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which separates a component of the first frequency from the electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference frequencies of the first and second frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

6. A flowmeter according to claim 5, wherein

on the basis of the amplitude ratio Ram obtained by said signal conversion section, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, and an amplitude

modulation index m_a of the first and second magnetic fields, said flow rate output section calculates the flow rate of the fluid by $\alpha \times \omega 0\{Ramm_a\cos(\theta 2/2) - 2\sin(\theta 2/2)\}/\{Ramm_a\sin(\theta 2/2) + 2\cos(\theta 2/2)\}$ (α is a coefficient).

7. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said measuring pipe, and applies a first magnetic field having a first frequency to the fluid;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by phase-modulating a carrier having the first frequency by a modulated wave having a second frequency;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which, when a frequency corresponding to an integer multiple of the second frequency is defined as a third frequency, separates a component of the first frequency from the electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference frequencies of the first and third frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

8. A flowmeter according to claim 7, wherein

on the basis of the amplitude ratio Rpm obtained by said signal conversion section, the first frequency $\omega 0$, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, a phase modulation index m_p of the second magnetic field, and a Bessel function of fractional order $j_n(m_p)$ ($n = 0$ or 1), said flow rate output section calculates the flow rate of the fluid by $\alpha \times [\omega 0\{-2J_0(m_p)\sin(\theta 2) + \{2J_0(m_p)^2 - J_0(m_p)^4 + 2J_0(m_p)^2 J_1(m_p)^2 Rpm^2 - 1 + 2J_1(m_p)^2 Rpm^2 - J_1(m_p)^4 Rpm^4\}^{1/2}\}]/\{J_0(m_p)^2 + 1 + 2J_0(m_p)\cos(\theta 2) - J_1(m_p)^2 Rpm^2\}$ (α is a coefficient).

9. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said measuring pipe, and applies, to the fluid, a first magnetic field obtained by phase-modulating a carrier having a first frequency by a modulated wave having a second frequency;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by phase-modulating the carrier having the first frequency by a modulated wave having the same frequency as that of the modulated wave and an opposite phase;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which, when a frequency corresponding to an integer multiple of the second frequency is defined as a third frequency, separates a component of the first frequency from the

electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference frequencies of the first and third frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

10. A flowmeter according to claim 9, wherein

on the basis of the amplitude ratio Rpm obtained by said signal conversion section, the first frequency $\omega 0$, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, a phase modulation index m_p of the first and second magnetic fields, and a Bessel function of fractional order $j_n(m_p)$ ($n = 0$ or 1), said flow rate output section calculates the flow rate of the fluid by $\alpha \times \omega 0[-\{J_0(m_p)^2\cos(\theta 2)\sin(\theta 2) + J_1(m_p)^2\sin(\theta 2)\cos(\theta 2)Rpm^2 + J_1(m_p)^2\sin(\theta 2)Rpm^2 + J_0(m_p)^2\sin(\theta 2)\} + 2|J_0(m_p)J_1(m_p)\{\cos(\theta 2) + 1\}Rpm|]/\{2J_0(m_p)^2\cos(\theta 2) + J_0(m_p)^2 + J_0(m_p)^2\cos(\theta 2)^2 - J_1(m_p)^2Rpm^2 + J_1(m_p)^2\cos(\theta 2)^2Rpm^2\}$ (α is a coefficient).

11. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said measuring pipe, and applies a first magnetic field having a first frequency to the fluid;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by frequency-modulating a carrier having the first frequency by a modulated wave having a second frequency;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which, when a frequency corresponding to an integer multiple of the second frequency is defined as a third frequency, separates a component of the first frequency from the electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference frequencies of the first and third frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

12. A flowmeter according to claim 11, wherein on the basis of the amplitude ratio Rfm obtained by said signal conversion section, the first frequency $\omega 0$, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, a frequency modulation index m_f of the second magnetic field, and a Bessel function of fractional order $j_n(m_f)$ ($n = 0$ or 1), said flow rate output section calculates the flow rate of the fluid by $\alpha \times [\omega 0\{-2J_0(m_f)\sin(\theta 2) + \{2J_0(m_f)^2 - J_0(m_f)^4 + 2J_0(m_f)^2 J_1(m_f)^2 Rfm^2 - 1 + 2J_1(m_f)^2 Rfm^2 - J_1(m_f)^4 Rfm^4\}^{1/2}\}]/\{J_0(m_f)^2 + 1 + 2J_0(m_f)\cos(\theta 2) - J_1(m_f)^2 Rfm^2\}$ (α is a coefficient).

13. An electromagnetic flowmeter comprising:

a measuring pipe through which a fluid to be measured flows;

an electrode which is arranged in said measuring pipe and detects an electromotive force generated by a magnetic field applied to the fluid and flow of the fluid;

a first exciting coil which is arranged separately from a plane, which includes said electrode and is perpendicular to a direction of an axis of said

measuring pipe, and applies, to the fluid, a first magnetic field obtained by frequency-modulating a carrier having a first frequency by a modulated wave having a second frequency;

a second exciting coil which is arranged on a side opposite to said first exciting coil with respect to the plane and applies, to the fluid, a second magnetic field obtained by frequency-modulating the carrier having the first frequency by a modulated wave having the same frequency as that of the modulated wave and an opposite phase;

a power supply section which supplies an exciting current to said first exciting coil and said second exciting coil;

a signal conversion section which, when a frequency corresponding to an integer multiple of the second frequency is defined as a third frequency, separates a component of the first frequency from the electromotive force detected by said electrode to obtain an amplitude, separates one of components of sum and difference frequencies of the first and third frequencies from the electromotive force to obtain an amplitude, and obtains a ratio of the amplitudes; and

a flow rate output section which calculates a flow rate of the fluid on the basis of the amplitude ratio obtained by said signal conversion section.

14. A flowmeter according to claim 13, wherein on the basis of the amplitude ratio Rfm obtained by said signal conversion section, the first frequency $\omega 0$, a phase difference $\theta 2$ between the carrier components of the first and second magnetic fields, a frequency modulation index m_f of the first and second magnetic fields, and a Bessel function of fractional order $j_n(m_f)$ ($n = 0$ or 1), said flow rate output section calculates the flow rate of the fluid by $\alpha \times \omega 0[-\{J_0(m_f)^2\cos(\theta 2)\sin(\theta 2) + J_1(m_f)^2\sin(\theta 2)\cos(\theta 2)Rfm^2 + J_1(m_f)^2\sin(\theta 2)Rfm^2 + J_0(m_f)^2\sin(\theta 2)\} + 2|J_0(m_f)J_1(m_f)\{\cos(\theta 2) + 1\}Rfm|]/\{2J_0(m_f)^2\cos(\theta 2) + J_0(m_f)^2 + J_0(m_f)^2\cos(\theta 2)^2 - J_1(m_f)^2Rfm^2 + J_1(m_f)^2\cos(\theta 2)^2Rfm^2\}$ (α is a coefficient).